LIST OF CONTENTS

Number 1

C.V. Devasia, N. Jyoti, K.S.V. Subbarao, K.S. Viswanathan, D. Tiwari and **R. Sridharan**: On the plausible linkage of thermospheric meridional winds with the equatorial spread F 1

S. Bruinsma, F. Vial and **G. Thuillier**: Relative density variations at 120 km derived from tidal wind observations made by the UARS/WINDII instrument. 13

Y. Zhang, D.J. McEwen and **L. Cogger**: The changing polar cap—Interball-2 and ground observations . . 21

A.Z. Liu, W.K. Hocking, S.J. Franke and **T. Thayaparan**: Comparison of Na lidar and meteor radar wind measurements at Starfire Optical Range, NM, USA 31

M.M. Lam and **A.S. Rodger**: The effect of Forbush decreases on tropospheric parameters over South Pole 41

E.W. Cliver, Y. Kamide and **A.G. Ling**: The semiannual variation of geomagnetic activity: phases and profiles for 130 years of *aa* data. 47

P.K. Bhuyan and **M. Chamua**: Electron density measurements in the topside F-region and its comparison with the IRI in the 75°E longitude sector 55

A.H. Manson, C.E. Meek, J. Koshyk, S. Franke, D.C. Fritts, D. Riggin, C.M. Hall, W.K Hocking, J. MacDougall, K. Igarashi and **R.A. Vincent**: Gravity wave activity and dynamical effects in the middle atmosphere (60–90 km): observations from an MF/MLT radar network, and results from the Canadian Middle Atmosphere Model (CMAM) 65

R. Mardiana, Z.-I. Kawasaki and **T. Morimoto**: Three-dimensional lightning observations of cloud-to-ground flashes using broadband interferometers. 91

P. Thejll and **K. Lassen**: Erratum to "Solar forcing of the Northern hemisphere land air temperature: new data" JASTP 62 (2000) 1207–1213. 105

International Geophysical Calendar 2002 (Final) 107

Number 2

STEP—RESULTS, APPLICATIONS AND MODELING PHASE (S-RAMP)

Preface. 113

G.K. Parks, L.J. Chen, M. Fillingim, R.P. Lin, D. Larson and **M. McCarthy**: A new framework for studying the relationship of aurora and plasma sheet dynamics. 115

A.T.Y. Lui: Multiscale phenomena in the near-Earth magnetosphere 125

G. Lu, S.W.H. Cowley, S.E. Milan, D.G. Sibeck, R.A. Greenwald and **T. Moretto**: Solar wind effects on ionospheric convection: a review 145

J.M. Ruohoniemi, S.G. Shepherd and **R.A. Greenwald**: The response of the high-latitude ionosphere to IMF variations 159

W.D. Gonzalez, B.T. Tsurutani, R.P. Lepping and **R. Schwenn**: Interplanetary phenomena associated with very intense geomagnetic storms 173

V.A. Pilipenko and **M.J. Engebretson**: Ground images at high latitudes of ULF wave processes in the outer magnetosphere 183

K. Labitzke, J. Austin, N. Butchart, J. Knight, M. Takahashi, M. Nakamoto, T. Nagashima, J. Haigh and **V. Williams**: The global signal of the 11-year solar cycle in the stratosphere: observations and models . . 203

Yu.I. Galperin: Multiple scales in auroral plasmas 211

E.W. Cliver and **H.S. Hudson**: CMEs: How do the puzzle pieces fit together? 231

I.A. Daglis and **J.U. Kozyra**: Outstanding issues of ring current dynamics 253

R.H.W. Friedel, G.D. Reeves and **T. Obara**: Relativistic electron dynamics in the inner magnetosphere — a review 265

Number 3

A. Pérez, I.A. de Cárcer and **F. Jaque**: Low ozone event at Madrid in November 1996 283

D.B. Subrahamanyam and **R. Ramachandran**: Air–sea interface fluxes over the Indian Ocean during INDOEX, IFP-99 291

L.A. Hajkowicz: Determination of the hemispheric character (i.e. southern or northern latitudinal position) of equatorial ionosonde stations as deduced from long-term recordings of the minimum height of the F-region (h'F) 307

M. Heinemann: Effects of solar wind inhomogeneities on transit times of interplanetary shock waves. . . 315

E. Pallé and **C.J. Butler**: The proposed connection between clouds and cosmic rays: cloud behaviour during the past 50–120 years 327

C.R. Reddi, T.V.C. Sarma and **P.B. Rao**: Spatial domain interferometric VHF radar observations of spread meteor echoes 339

M.V. Ratnam, D.N. Rao, T.N. Rao, M. Krishnaiah, Y.B. Kumar, V.S. Kumar and **P.B. Rao**: Coordinated MST radar and lidar observations for the study of mesospheric structures over a tropical station 349

M. Friedrich, M. Harrich, K.M. Torkar and **P. Stauning**: Quantitative measurements with wide-beam riometers 359

M. Plagmann, B.N. Lawrence and **G. Fraser**: Gravity waves in Fabry–Perot measurements made at Mt. John (44°S,170°E), New Zealand 367

F. Märcz and **J. Verő**: Pearl-type micropulsations at mid-latitude; their relation to whistlers, solar and geomagnetic activity as well as ionospheric absorption 377

Number 4

V.P. Ogibalov and **G.M. Shved**: Non-local thermodynamic equilibrium in CO_2 in the middle atmosphere: III. Simplified models for the set of vibrational states 389

J.J. Leko, M.P. Hickey and **P.G. Richards**: Comparison of simulated gravity wave-driven mesospheric airglow fluctuations observed from the ground and space 397

G. Thuillier, R.H. Wiens, G.G. Shepherd and **R.G. Roble**: Photochemistry and dynamics in thermospheric intertropical arcs measured by the WIND Imaging Interferometer on board UARS: A comparison with TIE-GCM simulations 405

A.A. Willoughby, T.O. Aro and **I.E. Owolabi**: Seasonal variations of radio refractivity gradients in Nigeria 417

M. Varvayanni, E. Davakis and **N. Catsaros**: Air and vegetated ground interactions in air quality diagnosis for emergency response 427

S.E. Daire, J.M.C. Plane, S.D. Gamblin, P. Soldán, E.P.F. Lee and **T.G. Wright**: A theoretical study of the ligand-exchange reactions of $Na^+ \cdot X$ complexes (X=O, O_2, N_2, CO_2 and H_2O): implications for the upper atmosphere 443

G.A. Hajj, E.R. Kursinski, L.J. Romans, W.I. Bertiger and **S.S. Leroy**: A technical description of atmospheric sounding by GPS occultation 451

R.J. Stening and **R.G. Rastogi**: Variations of the lunar geomagnetic tide in the Indian region 471

Numbers 5–6

SPACE STORMS AND SPACE WEATHER HAZARDS

I.A. Daglis and **A. Anastasiadis**: Preface 479

A. Anastasiadis: Acceleration of solar energetic particles: the case of solar flares 481

M. Gerontidou, A. Vassilaki, H. Mavromichalaki and **V. Kurt**: Frequency distributions of solar proton events 489

A. Glover, N.D.R. Ranns, D.S. Brown, L.K. Harra, S.A. Matthews and **J.L. Culhane**: The magnetic topology of a sigmoid 497

L.K. Harra: Changes in the solar magnetic field preceding a coronal mass ejection 505

J. Bochníček and **P. Hejda**: Areas of minimum intensity of soft X-rays as sources of solar wind high-speed streams 511

O.E. Malandraki, E.T. Sarris, L.J. Lanzerotti, P. Trochoutsos, G. Tsiropoula and **M. Pick**: Solar energetic particles inside a coronal mass ejection event observed with the ACE spacecraft 517

P.K. Marhavilas, E.T. Sarris and **G.C. Anagnostopoulos**: Observations of shock acceleration signatures by Ulysses: the 04:08:16, day147, 1991 UT shock 527

S.N. Kuznetsov, I.N. Myagkova, S.P. Ryumin, K. Kudela, R. Buchik and **H. Mavromichalaki**: Effects of the April 1994 Forbush events on the fluxes of the energetic charged particles measured on board CORONAS-I: their connection with conditions in the interplanetary medium 535

G. Consolini and **T. Chang**: Complexity, magnetic field topology, criticality, and metastability in magnetotail dynamics 541

D.C. Delcourt: Particle acceleration by inductive electric fields in the inner magnetosphere 551

A. Korth, R.H.W. Friedel, F. Frutos-Alfaro, C.G. Mouikis and **Q. Zong**: Ion composition of substorms during storm-time and non-storm-time periods 561

S.V. Dubyagin, V.A. Sergeev and **M.V. Kubyshkina**: On the remote sensing of plasma sheet from low-altitude spacecraft 567

N.F. Pisarenko, E.Yu. Budnik, Yu.I. Ermolaev, I.P. Kirpichev, V.N. Lutsenko, E.I. Morozova and **E.E. Antonova**: The ion differential spectra in outer boundary of the ring current: November 17, 1995 case study 573

O.A. Troshichev and **R.Yu. Lukianova**: Relation of PC index to the solar wind parameters and substorm activity in time of magnetic storms . . . 585

P. Bühler and **L. Desorgher**: Relativistic electron enhancements, magnetic storms, and substorm activity. 593

S.N. Kuznetsov and **I.N. Myagkova**: Quasi-trapped electron fluxes (>0.5 MeV) under the radiation belts: analysis of their connection with geomagnetic indices . . . 601

S.R. Elkington, M.K. Hudson, M.J. Wiltberger and **J.G. Lyon**: MHD/particle simulations of radiation belt dynamics . . . 607

I. Roth, R. Millan and **R.P. Lin**: Variations in planetary radiation belt fluxes and their radiative observations 617

G.I. Pugacheva, A.A. Gusev, U. Jayanthi, I.M. Martin and **W.N. Spjeldvik**: Antiparticles and light element isotope ions in the earth's magnetosphere . . . 625

I. Doxas, W. Horton and **R. Weigel**: Using particle simulations for parameter tuning of dynamical models of the magnetotail . . . 633

Z. Romeou and **T. Neukirch**: On the application of numerical continuation methods to the calculation of magnetostatic equilibria . . . 639

O.D. Constantinescu: Self-consistent model of mirror structures . . . 645

D. Jankovičová, P. Dolinský, F. Valach and **Z. Vörös**: Neural network-based nonlinear prediction of magnetic storms . . . 651

M.O. Riazantseva, P.A. Dalin, A.V. Dmitriev, Yu.V. Orlov, K.I. Paularena, J.D. Richardson and **G.N. Zastenker**: A multifactor analysis of parameters controlling solar wind ion flux correlations using an artificial neural network technique . . . 657

A. Shukla and **R.P. Sharma**: Nonlinear kinetic Alfven waves associated with saturating nonlinearity: applications to solar wind and coronal heating . . . 661

A.F. Iyudin: Terrestrial impact of the galactic historical SNe . . . 669

S.K. Solanki and **M. Fligge**: Solar irradiance variations and climate . . . 677

J.J. Sojka, M. David and **R.W. Schunk**: A mid-latitude space weather hazard driven directly by the magnetosphere . . . 687

J. Lastovicka: Monitoring and forecasting of ionospheric space weather—effects of geomagnetic storms 697

G. Cornélissen, F. Halberg, T. Breus, E.V. Syutkina, R. Baevsky, A. Weydahl, Y. Watanabe, K. Otsuka, J. Siegelova, B. Fiser and **E.E. Bakken**: Non-photic solar associations of heart rate variability and myocardial infarction . . . 707

L. Rosenqvist, A. Hilgers, E. Daly and **H. Evans**: Geometric model of diurnal and annual variation of keV electron region crossings on highly eccentric Earth orbits . . . 721

N. Jakowski, S. Heise, A. Wehrenpfennig, S. Schlüter and **R. Reimer**: GPS/GLONASS-based TEC measurements as a contributor for space weather forecast . . . 729

P. Dalin, G. Zastenker, K. Paularena and **J. Richardson**: The main features of solar wind plasma correlations of importance to space weather strategy . . . 737

I.A. Erinmez, J.G. Kappenman and **W.A. Radasky**: Management of the geomagnetically induced current risks on the national grid company's electric power transmission system . . . 743

D. Berghmans, F. Clette, P. Cugnon, J.-R. Gabryl, J.-F. Hochedez, R.A.M. Van der Linden and **E. Verwichte**: The solar influences data analysis centre 757

Number 7

A. Luts and **T. Parts**: Evolution of negative small air ions at two different temperatures 763

J. Lilensten and **P.L. Blelly**: The TEC and F2 parameters as tracers of the ionosphere and thermosphere . 775

K. Scherer, H. Fichtner and **O. Stawicki**: Shielded by the wind: the influence of the interstellar medium on the environment of Earth 795

J. Bremer and **U. Berger**: Mesospheric temperature trends derived from ground-based LF phaseheight observations at mid-latitudes: comparison with model simulations 805

R.L. Dowden, J.B. Brundell and **C.J. Rodger**: VLF lightning location by time of group arrival (TOGA) at multiple sites 817

V.A. Pilipenko, O.V. Kozyreva, M.J. Engebretson, D.L. Detrick and **S.N. Samsonov**: Dynamics of long-period magnetic activity and energetic particle precipitation during the May 15, 1997 storm 831

S.C. Collins, J.M.C. Plane, M.C. Kelley, T.G. Wright, P. Soldán, T.J. Kane, A.J. Gerrard, B.W. Grime, R.J. Rollason, J.S. Friedman, S.A. González, Q. Zhou, M.P. Sulzer and **C.A. Tepley**: A study of the role of ion–molecule chemistry in the formation of sporadic sodium layers 845

Erratum

S.E. Daire, J.M.C. Plane, S.D. Gamblin, P. Soldán, E.P.F. Lee and **T.G. Wright**: A theoretical study of the ligand-exchange reactions of $Na^+ \cdot X$ complexes ($X=O,O_2,N_2,CO_2$ and H_2O): implications for the upper atmosphere 861

Letter to the Editor

A.L. Clúa de Gonzalez, W.D. Gonzalez, B.T. Tsurutani and **V.M. Silbergleit**: Authors' response 871

Numbers 8–11

PSMOS 2000 WORKSHOP — PLANETARY SCALE MESOPAUSE OBSERVING SYSTEM

M. Hagan, Y. Portnyagin and **G. Shepherd**: Editorial. 873

ADVANCES IN MODELLING

M. Mlynczak: A comparison of space-based observations of the energy budgets of the mesosphere and the troposphere 877

D. Marsh and **R. Roble**: TIME-GCM simulations of lower-thermospheric nitric oxide seen by the halogen occultation experiment 889

N. Grieger, E.M. Volodin, G. Schmitz, P. Hoffmann, A.H. Manson, D.C. Fritts, K. Igarashi and **W. Singer**: General circulation model results on migrating and nonmigrating tides in the mesosphere and lower thermosphere. Part I: comparison with observations 897

ADVANCES IN GROUND-BASED OBSERVATIONS

R.J. Sica, T. Thayaparan, P.S. Argall, A.T. Russell and **W.K. Hocking**: Modulation of upper mesospheric temperature inversions due to tidal-gravity Wave interactions 915

C.S. Gardner, Y. Zhao and **A.Z. Liu**: Atmospheric stability and gravity wave dissipation in the mesopause region 923

T. Thayaparan and **W.K. Hocking**: A long-term comparison of winds and tides measured at London, Canada (43°N,81°W) by co-located MF and meteor radars during 1994–1999 931

T. Nakamura, S. Morita, T. Tsuda, H. Fukunishi and **Y. Yamada**: Horizontal structure of wind velocity field around the mesopause region derived from meteor radar observations 947

K. Igarashi, A. Pavelyev, J. Wickert, K. Hocke and **D. Pavelyev**: Application of radio holographic method for observation of altitude variations of the electron density in the mesosphere/lower thermosphere using GPS/MET radio occultation data. 959

W.R. Pendleton Jr. and **M.J. Taylor**: The impact of ***L*-uncoupling on Einstein coefficients for the OH Meinel (6,2) band: implications for** *Q*-branch rotational temperatures 971

G.A. Gavrilyeva and **P.P. Ammosov**: Near-mesopause temperatures registered over Yakutia 985

M.J. Taylor, M. Gadsden, R.P. Lowe, M.S. Zalcik and **J. Brausch**: Mesospheric cloud observations at unusually low latitudes 991

PROGRESS IN GRAVITY WAVES AND TIDES

N.M. Gavrilov, S. Fukao, T. Nakamura, C. Jacobi, D. Kürschner, A.H. Manson and **C.E. Meek**: Comparative study of interannual changes of the mean winds and gravity wave activity in the middle atmosphere over Japan, Central Europe and Canada. 1003

D. Pancheva, N.J. Mitchell, M.E. Hagan, A.H. Manson, C.E. Meek, Y. Luo, Ch. Jacobi, D. Kürschner, R.R. Clark, W.K. Hocking, J. MacDougall, G.O.L. Jones, R.A. Vincent, I.M. Reid, W. Singer, K. Igarashi, G.I. Fraser, T. Nakamura, T. Tsuda, Yu. Portnyagin, E. Merzlyakov, A.N. Fahrutdinova, A.M. Stepanov, L.M.G. Poole, S.B. Malinga, B.L. Kashcheyev, A.N. Oleynikov and **D.M. Riggin**: Global-scale tidal structure in the mesosphere and lower thermosphere during the PSMOS campaign of June–August 1999 and comparisons with the global-scale wave model. 1011

K. Igarashi, S.P. Namboothiri and **P. Kishore**: Tidal structure and variability in the mesosphere and lower thermosphere over Yamagawa and Wakkanai. 1037

F. Isoda, T. Tsuda, T. Nakamura, Y. Murayama, K. Igarashi, R.A. Vincent, I.M. Reid, A. Nuryanto and **S.L. Manurung**: Long-Period wind oscillations in the mesosphere and lower thermosphere at Yamagawa (32°N,131°E), Pontianak (0°N,109°E) and Christmas Island (2°N,157°W) 1055

D.J. Murphy: Variations in the phase of the semidiurnal tide over Davis, Antarctica 1069

K. Yamashita, S. Miyahara, Y. Miyoshi, K. Kawano and **J. Ninomiya**: Seasonal variation of non-migrating semidiurnal tide in the polar MLT region in a general circulation model 1083

N. Iwagami, T. Shibaki, T. Suzuki, Y. Yamada, H. Onishi, Y. Takahashi, H. Yamamoto, H. Sekiguchi, K. Mori, Y. Sano, M. Kubota, Y. Murayama, M. Ishii, K.-I. Oyama, R. Yoshimura, M. Shimoyama, Y. Koizumi, K. Shiokawa, N. Takegawa and **T. Nakamura**: The wave2000 campaign: overview and preliminary results 1095

G.G. Didebulidze, S.P. Chilingarashvili, T.I. Toroshelidze, I.G. Murusidze, N.D. Kvavadze and **Z.S. Sharadze**: On the possibility of in situ shear excitation of vortical perturbations and their coupling with short-period gravity waves by airglow and ionosphere observations. 1105

G.A. Gavrilyeva and **P.P. Ammosov**: Wave structures imaged in near-infrared nightglow at Yakutsk 1117

PROGRESS IN TRENDS AND VARIABILITY

T. Tsuda, S. Yoshida, F. Isoda, T. Nakamura, A. Nuryanto, S. Manurung, O. Sobari, R.A. Vincent and **I.M. Reid**: Long-term variations of atmospheric wave activity in the mesosphere and lower thermosphere region over the equatorial Pacific 1123

A.H. Manson, C.E. Meek, J. Stegman, P.J. Espy, R.G. Roble, C.M. Hall, P. Hoffmann and **Ch. Jacobi**: Springtime transitions in mesopause airglow and dynamics: photometer and MF radar observations in the Scandinavian and Canadian sectors 1131

M. Bittner, D. Offermann, H.-H. Graef, M. Donner and **K. Hamilton**: An 18-year time series of OH rotational temperatures and middle atmosphere decadal variations 1147

G.B. Burns, W.J.R. French, P.A. Greet, F.A. Phillips, P.F.B. Williams, K. Finlayson and **G. Klich**: Seasonal variations and inter-year trends in 7 years of hydroxyl airglow rotational temperatures at Davis station (69°S,78°E), Antarctica 1167

J. Scheer and **E.R. Reisin**: Most prominent airglow night at El Leoncito 1175

M.G. Shepherd, P.J. Espy, C.Y. She, W. Hocking, P. Keckhut, G. Gavrilyeva, G.G. Shepherd and **B. Naujokat**: Springtime transition in upper mesospheric temperature in the northern hemisphere. 1183

S.P. Zhang and **G.G. Shepherd**: Neutral winds and O(^{1}S) emission rates in the lower thermosphere as measured with WINDII/UARS during the April 4–5th 1993 and February 1994 geomagnetic storms 1201

PROGRESS IN PLANETARY SCALE INVESTIGATIONS

R.R. Clark, M.D. Burrage, S.J. Franke, A.H. Manson, C.E. Meek, N.J. Mitchell and **H.G. Muller**: Observations of 7-d planetary waves with MLT radars and the UARS-HRDI instrument 1217

P. Hoffmann, W. Singer and **D. Keuer**: Variability of the mesospheric wind field at middle and Arctic latitudes in winter and its relation to stratospheric circulation disturbances 1229

S. Sridharan, S. Gurubaran and **R. Rajaram**: Radar observations of the 3.5-day ultra-fast Kelvin wave in the low-latitude mesopause region 1241

A.I. Pogoreltsev, D. Pancheva and **N.J. Mitchell**: Secondary planetary waves in the middle atmosphere: numerical simulation and analysis of the neutral wind data 1251

H. Takahashi, R.A. Buriti, D. Gobbi and **P.P. Batista**: Equatorial planetary wave signatures observed in mesospheric airglow emissions 1263

D.Y. Wang, W.E. Ward, B.H. Solheim and **G.G. Shepherd**: Longitudinal variations of green line emission rates observed by WINDII at altitudes 90–120 km during 1991–1996 1273

Y. Luo, A.H. Manson, C.E. Meek, T. Thayaparan, J. MacDougall and **W.K. Hocking**: The 16-day wave in the mesosphere and lower thermosphere: simultaneous observations at Saskatoon (52°N, 107°W) and London (43°N, 81°W), Canada 1287

Numbers 12–14

EQUATORIAL AERONOMY

E. Kudeki, C.G. Fesen and **J.W. LaBelle**: Preface 1309

J.B. Nee, S. Thulasiraman, W.N. Chen, M.V. Ratnam and **D.N. Rao**: Middle atmospheric temperature structure over two tropical locations, Chung Li (25°N, 121°E) and Gadanki (13.5°N, 79.2°E) 1311

B.R. Clemesha, P.P. Batista and **D.M. Simonich**: Tide-induced oscillations in the atmospheric sodium layer 1321

P.P. Batista, B.R. Clemesha, D.M. Simonich, M.J. Taylor, H. Takahashi, D. Gobbi, I.S. Batista, R.A. Buriti and **A.F. de Medeiros**: Simultaneous lidar observation of a sporadic sodium layer, a "wall" event in the OH and OI5577 airglow images and the meteor winds 1327

C.G. Fesen, D.L. Hysell, J.M. Meriwether, M. Mendillo, B.G. Fejer, R.G. Roble, B.W. Reinisch and **M.A. Biondi**: Modeling the low-latitude thermosphere and ionosphere 1337

H. Rishbeth: Whatever happened to superrotation? 1351

M.J. Colerico and **M. Mendillo**: The current state of investigations regarding the thermospheric midnight temperature maximum (MTM) 1361

R. Raghavarao and **R. Suhasini**: Equatorial temperature and wind anomaly (ETWA)—a review 1371

T.J. Fuller-Rowell, G.H. Millward, A.D. Richmond and **M.V. Codrescu**: Storm-time changes in the upper atmosphere at low latitudes 1383

R.H. Wiens, V.P. Bhatnagar and **G. Thuillier**: Geomagnetic storm heating effects on the low-latitude dayside thermosphere from WINDII observations at equinox 1393

B.G. Fejer: Low latitude storm time ionospheric electrodynamics 1401

I.S. Batista, M.A. Abdu, J. MacDougall and **J.R. Souza**: Long term trends in the frequency of occurrence of the F_3 **layer over Fortaleza, Brazil** 1409

M. Devi, M.K. Barman and **A.K. Barbara**: Identification of quiet and disturbed days through IEC profile features over anomaly crest region 1413

M.A. Abdu, C.M. Denardini, J.H.A. Sobral, I.S. Batista, P. Muralikrishna and **E.R. de Paula**: Equatorial electrojet irregularities investigations using a 50 MHz back-scatter radar and a digisonde at São Luís: some initial results 1425

R. Raghavarao, A.K. Patra and **S. Sripathi**: Equatorial E region irregularities: a review of recent observations 1435

T.K. Ramkumar, S. Gurubaran and **R. Rajaram**: Lower E-region MF radar spaced antenna measurements over magnetic equator 1445

S. Sridharan, S. Gurubaran and **R. Rajaram**: Structural changes in the tidal components in mesospheric winds as observed by the MF radar during afternoon counter electrojet events 1455

L.J. Gelinas, M.C. Kelley and **M.F. Larsen**: Large-scale E-region electric field structure due to gravity wave winds 1465

R.L. Bishop, G.D. Earle, S.A. Gonzalez, M.P. Sulzer and **S.C. Collins**: Inferred vertical ion velocities associated with intermediate layers 1471

L.M. Kagan: Effects of neutral gas motions on midlatitude E region irregular structure 1479

P.A. Bernhardt: The modulation of sporadic-E layers by Kelvin–Helmholtz billows in the neutral atmosphere 1487

E.A. Kherani, R. Raghavarao and **R. Sekar**: Equatorial rising structure in nighttime upper E-region: a manifestation of electrodynamical coupling of spread F 1505

E.R. de Paula, I.J. Kantor, J.H.A. Sobral, H. Takahashi, D.C. Santana, D. Gobbi, A.F. de Medeiros, L.A.T. Limiro, H. Kil, P.M. Kintner and **M.J. Taylor**: Ionospheric irregularity zonal velocities over Cachoeira Paulista 1511

J.H.A. Sobral, M.A. Abdu, H. Takahashi, M.J. Taylor, E.R. de Paula, C.J. Zamlutti, M.G. de Aquino and **G.L. Borba**: Ionospheric plasma bubble climatology over Brazil based on 22 years (1977–1998) of 630 nm airglow observations 1517

M.C. Kelley, J.J. Makela and **A. Saito**: The mid-latitude *F* region at the mesoscale: some progress at last 1525

D.L. Hysell and **J.D. Burcham**: Long term studies of equatorial spread *F* using the JULIA radar at Jicamarca 1531

W.E. Swartz, S.C. Collins, M.C. Kelley, J.J. Makela, E. Kudeki, S. Franke, J. Urbina, N. Aponte, S. González, M.P. Sulzer and **J.S. Friedman**: First observations of an ***F*-region turbulent upwelling coincident with severe** *E*-region plasma and neutral atmosphere perturbations 1545

T. Maruyama, K. Nozaki, M. Yamamoto and **S. Fukao**: Ionospheric height changes at two closely separated equatorial stations and implications in spread ***F* onsets**. 1557

T. Farges and **E. Blanc**: HF radar observations of irregularities in the daytime equatorial ***F* region** 1565

F. Kamalabadi, G. Bust, K. Dymond, S. Gonzalez, P. Bernhardt, S. Chakrabarti, D. Cotton, A. Stephan, R. McCoy, S. Budzien and **S. Thonnard**: Tomographic studies of aeronomic phenomena using radio and UV techniques 1573

Product Review

D. Pallamraju, J. Baumgardner and **S. Chakrabarti**: HIRISE: a ground-based high-resolution imaging spectrograph using echelle grating for measuring daytime airglow/auroral emissions 1581

Number 15

K. Szalowski: The effect of the solar eclipse on the air temperature near the ground 1589

C.F. del Pozo, P.J.S. Williams, N.J. Gazey, P.N. Smith, F. Honary and **M. Kosch**: Multi-instrument observations of the dynamics of auroral arcs: a case study 1601

M. Takeda: The correlation between the variation in ionospheric conductivity and that of the geomagnetic Sq field 1617

I. Reda, J.R. Hickey, T. Stoffel and **D. Myers**: Pyrgeometer calibration at the National Renewable Energy Laboratory (NREL) 1623

M.G. Iziomon and H. Mayer: Assessment of some global solar radiation parameterizations 1631

N.I. Petrov and **F. D'Alessandro**: Verification of lightning strike incidence as a Poisson process 1645

C.Y. She, J. Sherman, J.D. Vance, T. Yuan, Z. Hu, B.P. Williams, K. Arnold, P. Acott and **D.A. Krueger**: Evidence of solar cycle effect in the mesopause region: observed temperatures in 1999 and 2000 at 98.5 km over Fort Collins, CO (41°N, 105°W) 1651

W.K. Peterson, H.L. Collin, M. Boehm, A.W. Yau, C. Cully and **G. Lu**: Investigation into the spatial and temporal coherence of ionospheric outVow on January 9–12, 1997 1659

Correspondence

G.R. Sonnemann: Comment on "Annual variation of geomagnetic activity" by Alicia L. Clúa de Gonzales et al. 1667

W. Schröder: Comment on the paper "The Centenary of solar-terrestrial physics" 1675

Number 16

Space Weather Effects on Technological Systems

J. Feynman, A. Ruzmaikin and **V. Berdichevsky**: The JPL proton fluence model: an update. 1679

D. Heynderickx: Radiation belt modelling in the framework of space weather effects and forecasting . . . 1687

J.R. Heirtzler: The future of the South Atlantic anomaly and implications for radiation damage in space . 1701

D.H. Brautigam: CRRES in review: space weather and its effects on technology 1709

R. Gubby and **J. Evans**: Space environment effects and satellite design 1723

H. Laakso: Variation of the spacecraft potential in the magnetosphere 1735

S. Basu, K.M. Groves, S. Basu and **P.J. Sultan**: Specification and forecasting of scintillations in communication/navigation links: current status and future plans. 1745

R.A. Gummow and **P. Eng**: GIC effects on pipeline corrosion and corrosion control systems. 1755

T.S. Molinski: Why utilities respect geomagnetically induced currents 1765

D. Beamish, T.D.G. Clark, E. Clarke and **A.W.P. Thomson**: Geomagnetically induced currents in the UK: geomagnetic variations and surface electric fields 1779

L. Bolduc: GIC observations and studies in the Hydro-Québec power system. 1793

Number 17

C.T. Russell and **M. Fleishman**: Joint control of region-2 field-aligned currents by the east–west component of the interplanetary electric field and polar cap illumination 1803

C.-C. Cheng, C.T. Russell, Y.F. Gao and **P.J. Chi**: On consecutive bursts of low-latitude Pi2 pulsations. . . 1809

P.J. Espy and **H. Jutt**: Equilibrium temperature of water–ice aerosols in the high-latitude summer mesosphere 1823

K. Unnikrishnan, R. Balachandran Nair and **C. Venugopal**: Harmonic analysis and an empirical model for TEC over Palehua 1833

N.G. Prezerakos and **H.A. Flocas**: Regional and global large-scale dynamics associated with a prolonged drought event in Greece. 1841

J. Manninen, N.G. Kleimenova, O.V. Kozyreva and **A. Ranta**: High-latitude geomagnetic pulsation response to the passage of the front edge of the interplanetary magnetic cloud of January 10, 1997 1855

D. Pancheva, E. Merzlyakov, N.J. Mitchell, Yu. Portnyagin, A.H. Manson, Ch. Jacobi, C.E. Meek, Y. Luo, R.R. Clark, W.K. Hocking, J. MacDougall, H.G. Muller, D. Kürschner, G.O.L. Jones, R.A. Vincent, I.M. Reid, W. Singer, K. Igarashi, G.I. Fraser, A.N. Fahrutdinova, A.M. Stepanov, L.M.G. Poole, S.B. Malinga, B.L. Kashcheyev and **A.N. Oleynikov**: Global-scale tidal variability during the PSMOS campaign of June–August 1999: interaction with planetary waves 1865

M.A. Davydenko, N.V. Ilyin and **V.V. Khakhinov**: On the shape of measured spectra of the ionosphere sounding by an FMCW signal under dispersion case 1897

Erratum 1903

Number 18

G.L. Siscoe and **K.D. Siebert**: Solar–terrestrial effects possibly stronger in biblical times 1905

M. Mendillo, H. Rishbeth, R.G. Roble and **J. Wroten**: Modelling F2-layer seasonal trends and day-to-day variability driven by coupling with the lower atmosphere 1911

E.L. Afraimovich, E.A. Kosogorov and **O.S. Lesyuta**: Effects of the August 11, 1999 total solar eclipse as deduced from total electron content measurements at the GPS network 1933

E.L. Afraimovich, Ya.F. Ashkaliev, V.M. Aushev, A.B. Beletsky, V.V. Vodyannikov, L.A. Leonovich, O.S. Lesyuta, Yu.V. Lipko, A.V. Mikhalev and **A.F. Yakovets**: Simultaneous radio and optical observations of the mid-latitude atmospheric response to a major geomagnetic storm of 6–8 April 2000 1943

S.S. Gong, G.T. Yang, J.M. Wang, B.M. Liu, X.W. Cheng, J.Y. Xu and **W.X. Wan**: Occurrence and characteristics of sporadic sodium layer observed by lidar at a mid-latitude location 1957

R. Pirjola: Fundamentals about the flow of geomagnetically induced currents in a power system applicable to estimating space weather risks and designing remedies 1967

M.-B. Kallenrode: Magnetic clouds and interplanetary particle transport: a numerical model 1973

B. Morel, H. Bencherif, P. Keckhut, S. Baldy and **A. Hauchecorne**: Evidence of tidal perturbations in the middle atmosphere over Southern Tropics as deduced from LIDAR data analyses 1979

V.C. Mushtak and **E.R. Williams**: ELF propagation parameters for uniform models of the Earth–ionosphere waveguide 1989

L.-C. Tsai, C.H. Liu, W.H. Tsai and **C.T. Liu**: Tomographic imaging of the ionosphere using the GPS/MET and NNSS data 2003

G.B. Burns, P.F.B. Williams, R.P. Lowe, W.J.R. French, P.A. Greet and **D.P. Monselesan**: Argon auroral emissions 2013

M.M. Echim and **J. Lemaire**: Positive density gradients at the magnetopause: interpretation in the framework of the impulsive penetration mechanism 2019

D.A. Holdsworth, R. Vuthaluru, I.M. Reid and **R.A. Vincent**: Differential absorption measurements of mesospheric and lower thermospheric electron densities using the Buckland Park MF radar 2029

R. Vuthaluru, R.A. Vincent, D.A. Holdsworth and **I.M. Reid**: Collision frequencies in the D-region 2043

R. Orús, M. Hernández-Pajares, J.M. Juan, J. Sanz and **M. García-Fernández**: Performance of different TEC models to provide GPS ionospheric corrections 2055

R.P. Kane: Mismatch between variations of solar indices, stratospheric ozone and UV-B observed at ground 2063